

Claims

1. An apparatus for conditioning a polishing pad used in chemical mechanical planarization of semiconductor wafers, the polishing pad moving in a forward direction, the apparatus comprising:

a liquid distribution unit having at least one opening upon which liquid is forced through at high pressure, the opening positioned facing the polishing pad;

10 a liquid recovery unit for retrieving liquid and debris, the liquid recovery unit positioned downstream from the liquid distribution unit and having at least one opening connected with a vacuum; and

15 a housing forming a liquid chamber disposed around the opening of the liquid distribution unit and a vacuum chamber disposed around the opening of the liquid recovery unit, wherein the vacuum chamber is in communication with the liquid chamber.

2. The apparatus of claim 1, wherein a bottom surface of the housing is in communication with the polishing pad.

20 3. The apparatus of claim 1, further comprising a seal disposed along a length of a bottom surface of the housing, the seal located between the housing and the polishing pad.

25 4. The apparatus of claim 1, further comprising an abrasive substance disposed along at least a portion of a bottom surface of the housing, the abrasive substance located between the housing and the polishing pad.

5. The apparatus of claim 1, wherein the polishing pad has a width, and the housing has a length that is at least equal to the width of the polishing pad.

6. The apparatus of claim 1, further comprising:

a slurry recovery unit for retrieving slurry, the slurry recovery unit positioned upstream from the liquid container and having at least one opening connected with a vacuum.

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7. The apparatus of claim 6, wherein the housing forms a slurry chamber disposed around the opening of the slurry recovery unit.

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8. The apparatus of claim 1, wherein the polishing pad is mounted upon a linear belt polisher.

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9. The apparatus of claim 1, wherein the housing further comprises a containment portion surrounding the liquid distribution unit and the liquid recovery unit, and a curved portion disposed around the opening of the liquid recovery unit.

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10. An apparatus for conditioning a polishing pad in a semiconductor wafer polishing device, the apparatus comprising:

a liquid distribution unit forming at least one opening, the opening directed at the polishing pad; and

a liquid recovery unit positioned downstream from the liquid distribution unit and in communication with the polishing pad, the liquid recovery unit forming at least one opening.

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11. The apparatus of claim 10, wherein the liquid distribution unit forms a series of small openings, the polishing pad has a width, and the series of small openings span at least 50% of the width of the polishing pad.

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12. The apparatus of claim 10, wherein the liquid distribution unit forms a series of small openings, the polishing pad has a width, and the series of small openings span substantially all of the width of the polishing pad.

13. The apparatus of claim 11 or 12, wherein the small openings comprise nozzles.

5           14. The apparatus of claim 10, wherein the liquid distribution unit comprises a liquid container for storing an amount of liquid, the liquid container is in communication with the opening of the liquid distribution unit.

10           15. The apparatus of claim 14, wherein the pressure within the liquid container is maintained at a pressure of about 15 PSIG to about 100 PSIG.

15           16. The apparatus of claim 10, wherein the opening of the liquid distribution unit forms a slit.

15           17. The apparatus of claim 16, wherein the polishing pad has a width, and the slit spans substantially all of the width of the polishing pad.

20           18. The apparatus of claim 10 wherein the opening of the liquid recovery unit is connected with a vacuum.

20           19. The apparatus of claim 18, further comprising a curved portion disposed around the opening of the liquid recovery unit, in order to increase the amount of suction by the vacuum on the polishing pad.

25           20. The apparatus of claim 18, wherein the polishing pad has a width, and the liquid recovery unit spans substantially all of the width of the polishing pad.

21. The apparatus of claim 18, wherein the vacuum applies a suction force of about -3 PSIG to about -10 PSIG to the polishing pad.

22. A method for conditioning a polishing pad used in chemical mechanical planarization of semiconductor wafers, the polishing pad containing an amount of slurry, the method comprising:

5 applying a stream of pressurized liquid to the polishing pad; and  
removing a significant amount of slurry and liquid from the  
polishing pad using a vacuum.

23. The method of claim 22 further comprising:

10 removing at least a portion of the slurry from the polishing pad  
using a vacuum, before the applying of a stream of pressurized liquid; and  
running the removed slurry through a slurry reclaim system in order  
to remove impurities from the slurry.

15 24. The method of claim 22 wherein the applying of a stream of  
pressurized liquid further comprises applying the stream of pressurized liquid  
along a substantial amount of the width of the polishing pad.

20 25. The method of claim 22 further comprising providing a housing  
around the stream of pressured liquid and the vacuum, the housing in  
communication with the polishing pad.